March 13, 2013

Chairman Julius Genachowski
Commissioner Robert McDowell
Commissioner Mignon Clyburn
Commissioner Jessica Rosenworcel
Commissioner Ajit Pai
Federal Communications Commission
445 12th Street, SW
Washington, DC 20554

Re: *Implementation of the Middle Class Tax Relief and Job Creation Act of 2012 – Identification of 15 Megahertz of Contiguous Spectrum for Mobile Broadband*; *A National Broadband Plan for Our Future*, GN Docket No. 09-51

Dear Chairman and Commissioners,

CTIA—The Wireless Association ("CTIA") has been a welcome partner with the Commission, Congress, and the Administration in highlighting the benefits of mobile broadband, the need for additional spectrum, and the development of policy tools to identify and repurpose spectrum to meet the needs of U.S. consumers and businesses. With this letter and attached white paper, *Finding the FCC's 15 MHz*, CTIA urges the Commission to promptly begin the process of implementing Section 6401(b)(2)(E) of the Middle Class Tax Relief and Job Creation Act of 2012 ("Spectrum Act") and identify 15 MHz of contiguous spectrum for reallocation to commercial mobile broadband use. As discussed below and in the attached white paper, CTIA believes that the Commission should closely consider spectrum from the Broadcast Auxiliary Service ("BAS") as the most effective and sensible candidate band.

Policymakers on a bipartisan basis have recognized that there is an urgent need for more spectrum to meet the explosive growth in consumer demand for mobile broadband services and to accommodate the development of an increasingly mobile and interconnected world. Thankfully, Congress has taken positive action to help the Commission to alleviate this looming crunch for capacity through the adoption of bipartisan legislation. The 2012 Spectrum Act is a legislative landmark that presents the Commission both with great opportunity and great responsibility. CTIA applauds the initial efforts by the Commission to enact the provisions of the Spectrum Act, including new proceedings for both incentive auctions and licensing of the 1915-1920/1995-2000 MHz band (the "H Block"). In addition to these positive first steps, CTIA strongly encourages the Commission to commence work on the specific mandate under Section 6401(b)(2)(E) of the Spectrum Act: the identification, allocation, auction, and assignment of 15 megahertz of contiguous spectrum for mobile broadband services. As the Spectrum Act dictates that this new 15 megahertz of spectrum must be identified, allocated and licensed by February 2015, there is very little time remaining for the

statutory deadline to be met. Therefore, CTIA urges the Commission to begin the process of implementing this section of the Act with the purpose of identifying this 15 megahertz in an expeditious fashion.

CTIA believes that the 15 MHz of spectrum that is to be identified by the Commission could most effectively be utilized by the commercial mobile broadband industry if it is suitable for mobile services, adjacent to existing bands and readily available for pairing with other spectrum. With these characteristics in mind, CTIA would note that the most logical outcome would be to assure that the 15 megahertz of spectrum identified by NTIA as part of the Spectrum Act (1695-1710 MHz) be capable of being paired with the spectrum to be identified by the FCC. CTIA believes that the Commission should closely consider spectrum from the Broadcast Auxiliary Service ("BAS") as a most effective candidate band. This spectrum band is below 3 GHz, is contiguous and adjacent to current allocations, and would allow pairing in a readily achievable fashion. CTIA is not aware of any other spectrum bands as well-positioned as this band to meet all the key principles for mobile broadband spectrum that could be paired with the specific 15 MHz identified by NTIA, and that could be put to timely use and generate significant revenues through a competitive bidding process. While there currently are issues involved with making this band available for commercial mobile use, CTIA believes that the Commission should begin a process to work to address those issues. By moving swiftly and by identifying spectrum that allows for rapid use for mobile broadband services, the Commission will be best positioned to both meet the statutory requirements of the Spectrum Act and to address the looming spectrum crunch.

The wireless industry is at a critical crossroads – the long warned spectrum shortage is at an inflection point. The Commission, working together with NTIA, has a historic opportunity to step forward and respond to this looming spectrum crisis in an effective, expeditious manner. The passage of the Spectrum Act, including Section 6401(b)(2)(E), provides the impetus for swift and precise action to enact rules and policies to bring needed spectrum to the market. By moving forward quickly to identify 15 MHz of contiguous spectrum, to be paired with the 15 MHz of spectrum already identified by NTIA, the Commission can realize the goals of the National Broadband Plan, the Administration, the Congress and the American people to ensure that the incredible growth, investment and innovation of the wireless industry is sustained and expanded. CTIA and the wireless industry stand ready to join the Commission and NTIA in implementing the Spectrum Act and meeting these critical goals.

Sincerely,

Steve Largent
President and CEO
CTIA-The Wireless Association

Finding The FCC's 15 MHz:

Implementation of Section 6401(b)(2)(E) of the Middle Class Tax Relief and Job Creation Act of 2012 – Identification of 15 Megahertz of Contiguous Spectrum for Mobile Broadband

Prepared By:

CTIA
The Wireless Association™

Policymakers on a bipartisan basis have recognized that there is an urgent need for more spectrum to meet the explosive growth in consumer demand for mobile broadband services and to accommodate the development of an increasingly mobile and interconnected world. Thankfully, Congress has taken positive action to help the Commission to alleviate this looming crunch for capacity through the adoption of bipartisan legislation, the Middle Class Tax Relief and Job Creation Act of 2012 ("Spectrum Act").[1] The 2012 Spectrum Act is a legislative landmark that presents the Commission both with great opportunity and great responsibility. In this white paper, CTIA urges the Commission to promptly begin the process of implementing Section 6401(b)(2)(E) of the Spectrum Act and identify 15 MHz of contiguous spectrum for reallocation to commercial mobile broadband use. As discussed below, CITA believes that the Commission should closely consider spectrum from the Broadcast Auxiliary Service ("BAS") as the most effective and sensible candidate band.

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[1] Middle Class Tax Relief and Job Creation Act of 2012, Pub. L. No. 112-96, 126 Stat. 156 (2012) ("Spectrum Act").

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The Need For Mobile Broadband Spectrum. The Commission recently noted that "usage of [America's] wireless networks is skyrocketing, dramatically increasing demands on both licensed and unlicensed spectrum—the invisible infrastructure on which all wireless networks depend."[2] Spectrum is "an essential natural resource"[3] – and U.S. wireless networks are dangerously close to running out of it. For the U.S. to maintain its global leadership in the mobile ecosystem, the Commission must bring to market additional spectrum – and do so quickly.

CTIA has been at the forefront of discussing the need for additional spectrum for mobile broadband. CTIA first identified a gathering spectrum storm and looming spectrum crisis in September 2009, when it urged U.S. policymakers to "immediately launch an effort to identify and allocate significant amounts of additional spectrum for commercial wireless services if the U.S. wants mobile providers to continue expanding their wireless networks and services to meet rapidly expanding demand."[4] As CTIA explained in the *2009 Looming Spectrum Crisis* white paper:

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[2] *Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions, Notice of Proposed Rulemaking*, FCC 12-118, ¶ 1 (Sept. 28, 2012) ("*TV Incentive Auctions NPRM*").

[3] "Winning the Global Bandwidth Race: Opportunities and Challenges for Mobile Broadband," Prepared Remarks of FCC Chairman Julius Genachowski, University of Pennsylvania – Wharton, Philadelphia, PA (Oct. 4, 2012).

[4] Letter from Christopher Guttman-McCabe to Chairman Julius Genachowski et al, Federal Communications Commission, GN Docket No. 09-51, at 5 (Sept. 29, 2009).

> [A]larmingly, there is a looming spectrum crisis for U.S. consumers and businesses, which are rapidly embracing and increasingly dependent on this "wherever, whenever" access. A confluence of market trends has the potential to thwart the full promise of the mobile broadband future. Without swift and bold action by U.S. policymakers to free up a critical national resource—our nation's airwaves—consumers and businesses in this country will find themselves unable to reap the full benefits of the mobile broadband age.[5]

Developments since the release of CTIA's *2009 Looming Spectrum Crisis* paper have only confirmed and reinforced the basic conclusion that rapid consumer demand and evolving consumer usage of mobile broadband, fueled by the deployment of mobile broadband networks and innovative devices and services, will create unprecedented demand for spectrum. The following statistics illustrate the contours of this burgeoning mobile revolution:

- As of mid-year 2012, the U.S. wireless industry served more than 321 million active subscribers.[6]
- U.S. subscribers are overwhelmingly adopting mobile broadband:
  - In 2013 alone, nearly 132 million smartphones will be sold in the U.S.[7]
  - And by mid-2012 78% of U.S. adults had a smartphone.[8]
- Mobile broadband devices are driving dramatic changes in consumer usage. For example:
  - A smartphone on a 4G network uses 50% more data than the same smartphone on a 3G network.[9]
  - The average smartphone data usage almost tripled in 2011, growing from 55 MB/month in 2010 to 150 MB/month. And by 2016, the average smartphone is projected to generate 2.6 GB/month.[10]
- Consumers are embracing the "Apps Economy" and new "data-intensive" services:

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[5] *Id.* at 1.

[6] See CTIA Press Release, Consumer Data Traffic Increased 104 Percent According to CTIA-The Wireless Association® Semi-Annual Survey, October 11, 2012, at http://www.ctia.org/media/press/body.cfm/prid/2216.

[7] CEA, Consumer Electronics Detailed Forecast, 2011-2016 (Jan. 2013).

[8] Peter Farago, Flurry Analytics, *iOS and Android Adoption Explodes Internationally* (Aug. 27, 2012), http://blog.flurry.com/bid/88867/iOS-and-Android-Adoption-Explodes-Internationally.

[9] Prepared Remarks of FCC Chairman Julius Genachowski, *Winning the Global Bandwidth Race: Opportunities and Challenges for Mobile Broadband* (Oct. 4, 2012), http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-316661A1.pdf.

[10] Cisco, CISCO VISUAL NETWORKING INDEX: GLOBAL MOBILE DATA TRAFFIC FORECAST UPDATE, 2011–2016 at 2 (Feb. 14, 2012), http://www.cisco.com/en/US/solutions/collateral/ns341/ns525/ns537/ns705/ns827/white_paper_c11-520862.pdf.

    - In June 2012, the application stores for Apple and Android had a collective 3 billion downloads.[11]
    - By 2016, revenue in the app market is projected to be $46 billion.[12]
    - In 2012, mobile video traffic exceeded 50% of wireless traffic for the first time. By 2017, it is projected that two-thirds of the world's mobile data traffic will be video – a 16-fold increase from 2012 to 2017.[13]
- These changes have led to explosive growth in mobile broadband traffic:
    - Wireless data traffic on licensed mobile networks has repeatedly doubled year-over-year. From July 2011 to June 2012, reported wireless data traffic over all U.S. wireless devices totaled 1.16 trillion megabytes, compared to 568 billion megabytes a year before, a 104% increase year-over-year.[14]
    - By 2016, traffic on licensed mobile networks is projected to grow 16-fold.[15] Globally, by 2016, over 80 percent of broadband connections will be mobile.[16]
- We are entering a new phase of integration of mobile broadband services into new fields.
    - These "verticals" will harness mobile broadband to improve not just business productivity but also education, health care, public safety, energy consumption, transportation, and e-government initiatives.
- We are also on the verge of what some refer to as the Internet of Things, in which machines communicate seamlessly with one another through M-2-M communications:
    - In 2011, total M2M traffic in the U.S. increased more than 250%.[17]

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[11] Prepared Remarks of FCC Chairman Julius Genachowski, *Winning the Global Bandwidth Race: Opportunities and Challenges for Mobile Broadband* (Oct. 4, 2012), http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-316661A1.pdf.

[12] Prepared Remarks of FCC Chairman Julius Genachowski, *Winning the Global Bandwidth Race: Opportunities and Challenges for Mobile Broadband* (Oct. 4, 2012), http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-316661A1.pdf.

[13] Cisco, CISCO VISUAL NETWORKING INDEX: GLOBAL MOBILE DATA TRAFFIC FORECAST UPDATE, 2012–2017 at 1-3 (Feb. 14, 2013), http://www.cisco.com/en/US/solutions/collateral/ns341/ns525/ns537/ns705/ns827/white_paper_c11-520862.pdf.

[14] Press Release, CTIA-The Wireless Association, Consumer Data Traffic Increased 104 Percent According to CTIA-The Wireless Association Semi-Annual Survey (Oct. 11, 2012), http://www.ctia.org/media/press/body.cfm/prid/2216.

[15] Prepared Remarks of FCC Chairman Julius Genachowski, *Winning the Global Bandwidth Race: Opportunities and Challenges for Mobile Broadband* (Oct. 4, 2012), http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-316661A1.pdf.

[16] William Bold and William Davidson, Qualcomm, MOBILE BROADBAND: REDEFINING INTERNET ACCESS AND EMPOWERING INDIVIDUALS IN THE GLOBAL INFORMATION TECHNOLOGY REPORT 2012, at 68, http://www3.weforum.org/docs/GITR/2012/GITR_Chapter1.5_2012.pdf.

- The cellular M2M market will reach 33.3 million connections in the U.S. in 2012 and grow to 114.7 million connections by 2016.[18]

As these statistics demonstrate, since CTIA first identified the spectrum crunch in 2009, the wireless industry has undergone significant evolutions that have only increased the strain on America's wireless networks. The tablet market did not even exist in 2009. Today, many tablet devices come equipped with CMRS and Wi-Fi capability, dramatically increasing wireless usage across both platforms.[19] Recent research has revealed that one-fifth of U.S. homes are now tablet owners.[20] And these devices are increasingly being used in the home as well as while mobile – 85 percent of mobile users use their tablet or smartphone while watching video at least once per month, with 40 percent doing so daily.[21] CMRS networks have also seen an explosion of uses for "vertical" sectors of the economy: mHealth, mobile education, intelligent transportation, smart grid, inventory control, traffic management, and more.[22]

Through research efforts such as its Semi-Annual Survey, CTIA has produced volumes of data demonstrating the growth of data consumption by wireless subscribers in the U.S. CTIA has also been a major contributor to the Commission's spectrum proceedings, and countless others have echoed CTIA's call for additional spectrum.[23] Countless other entities have also studied the growth of mobile broadband in the United States, and have found that the current trend of explosive data demand is unlikely to slow.

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[17] M. Zubair Shafiq et al., A FIRST LOOK AT CELLULAR MACHINE-TO-MACHINE TRAFFIC – LARGE SCALE MEASUREMENT AND CHARACTERIZATION, SIGMETRICS'12, June 11–15, 2012, https://www.msu.edu/~shafiqmu/files/m2m_sigmetrics12.pdf.

[18] Compass Intelligence, Why Most M2M Forecasts are Wrong, (Nov. 7, 2012), http://www.prnewswire.com/news-releases/why-most-m2m-forecasts-are-wrong-compass-intelligence-explains-and-states-the-m2m-market-will-reach-1147-million-connections-by-year-end-2016-177628091.html.

[19] *See* Chetan Sharma Consulting, State of the Global Mobile Industry Annual Assessment - 2012, (April 2012), *available at:* ttp://www.chetansharma.com/Annual_State_of_Global_Mobile_Industry_2012_Chetan_Sharma_Consulting.pdf (showing that 37 percent of tablets in the U.S. are CMRS capable).

[20] Sarah Perez, "Nielsen: 85 Percent of Tablet and Smartphone Owners Use Devices as 'Second Screen' Monthly, 40 Percent Do So Daily," TechCrunch (Dec. 5, 2012), *available at* http://techcrunch.com/2012/12/05/nielsen-85-percent-of-tablet-and-smartphone-owners-use-devices-as-second-screen-monthly-40-percent-do-so-daily/.

[21] *Id.*

[22] *See, e.g.*, Letter from Christopher Guttman-McCabe, CTIA – The Wireless Association, to Marlene H. Dortch, FCC, GN Docket Nos. 12-268, 09-51; WT Docket No. 11-186 (Jan. 22, 2013) (including links and QR codes to several CTIA videos, each focused on a subject area benefiting from wireless innovation).

[23] Comments of CTIA – The Wireless Association®, GN Docket No. 12-268, at 6-7 (Jan. 25, 2013).

These developments have been made possible by a confluence of investent and innovation, including the significant investments made by America's wireless companies in next-generation networks. The first Long Term Evolution ("LTE") networks were deployed in the United States in 2010, and the growth of these and other advanced generation wireless networks means "that what was once considered only in the realm of desktop computers – or someone's imagination – is now seamlessly mobile."[24] In response to greater network speeds, innovators have developed increasingly advanced devices and applications that ultimately result in greater data consumption by end users. By any metric, wireless broadband usage in the United States is skyrocketing. As a result, and as noted above, CTIA's recent Semi-Annual Survey revealed that reported wireless traffic in the most recent 12-month period totaled 1.16 trillion MB, up 104% from 568 billion MB the year before.[25]

As the Commission has repeatedly acknowledged, the allocation and deployment of additional licensed mobile broadband must occur for customers to continue enjoying the benefits of mobile broadband. Thus, Chairman Genachowski has emphasized that "clearing and auctioning spectrum for exclusive licensed use must remain a core component of spectrum policy."[26] Similarly, the Commission has also recognized "the need for timely action to free spectrum for mobile broadband."[27] Indeed, the National Broadband Plan concluded that "[b]oth mobile network performance and the availability of mobile broadband rely on the availability of spectrum"[28] and found that:

> If the U.S. does not address this situation promptly, scarcity of mobile broadband could mean higher prices, poor service quality, an inability for the U.S. to compete internationally, depressed demand and, ultimately, a drag on innovation.[29]

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[24] Verizon Wireless, In Two Years 4G LTE Has Changed the Mobile Lifestyle (Dec. 5, 2012), *available at* http://news.verizonwireless.com/news/2012/12/verizon-wireless-4G-LTE-two-year-anniversary.html.

[25] *See* CTIA Press Release, Consumer Data Traffic Increased 104 Percent According to CTIA-The Wireless Association® Semi-Annual Survey, Oct. 11, 2012, *available at* http://www.ctia.org/media/press/body.cfm/prid/2216 (last accessed Feb. 5, 2013).

[26] Genachowski Wharton Remarks at 11.

[27] Federal Communications Commission, MOBILE BROADBAND: THE BENEFITS OF ADDITIONAL SPECTRUM, at 2 (Oct. 2010); *see also Serv. Rules for Advanced Wireless Servs. in the 2000-2020 MHz and 2180-2200 MHz Bands*, Notice of Proposed Rulemaking and Notice of Inquiry, 27 FCC Rcd 3561, 3566-67 ¶¶ 10, 12 (2012) ("According to Cisco Systems, North American mobile Internet traffic more than doubled in 2011 and is expected to grow over 15-fold in the next five years. This explosive growth is creating an urgent need for more network capacity and, in turn, for suitable spectrum.").

[28] NBP at 22.

[29] *Id. at 77. See also id.* at 85 ("[T]he accelerating nature of industry analyst demand forecasts makes clear that it is not a question of *if* the U.S. will require 300 megahertz of spectrum for mobile broadband, but *when*.") (emphasis in original).

Similarly, President Obama and the Administration have repeatedly underscored the importance of delivering spectrum that is suitable for mobile broadband, i.e., licensed, exclusive-use spectrum below 3 GHz with flexible service rules. In his 2011 State of the Union Remarks, President Obama issued a goal for ubiquitous mobile connectivity:

> Within the next five years, we'll make it possible for businesses to deploy the next generation of high-speed wireless coverage to 98 percent of all Americans. This isn't just about -- (applause) -- this isn't about faster Internet or fewer dropped calls. It's about connecting every part of America to the digital age.[30]

To achieve this end, President Obama also called for a National Wireless Initiative which would "Nearly Double Wireless Spectrum Available for Mobile Broadband."[31] The Administration's National Wireless Initiative directed that "[t]he majority of the freed up spectrum would be auctioned for licensed mobile broadband."[32] Similarly, the Administration's Presidential Memorandum directed that NTIA "collaborate with the [FCC] to make available a total of 500 MHz of Federal and nonfederal spectrum over the next 10 years, suitable for both mobile and fixed wireless broadband use."[33]

The Commission must implement Section 6401(b)(2)(E)'s directive with this framework and this identified national need in mind. As explained in further detail below, CTIA recommends that the Commission explore a pairing of the 15 megahertz it identifies with the 1695-1710 MHz band to be reallocated for mobile broadband services.[34] The spectrum ultimately identified by the Commission will play an important role in addressing the spectrum crunch and in meeting the objectives of both the Spectrum Act and the National Broadband Plan.

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[30] The White House, Remarks by the President in State of Union Address (Jan. 25, 2011), *available at* http://www.whitehouse.gov/the-press-office/2011/01/25/remarks-president-state-union-address.

[31] The White House, Fact Sheet: President Obama's Plan to Win the Future through the Wireless Innovation and Infrastructure Initiative (Feb. 10, 2011), *available at* http://www.whitehouse.gov/the-press-office/2011/02/10/president-obama-details-plan-win-future-through-expanded-wireless-access.

[32] *Id.*

[33] The White House, Presidential Memorandum: Unleashing the Wireless Broadband Revolution, Memorandum For The Heads Of Executive Departments And Agencies (June 28, 2010), *available at* http://www.whitehouse.gov/the-press-office/presidential-memorandum-unleashing-wireless-broadband-revolution.

[34] U.S. Department of Commerce, *Identification of 15 Megahertz of Spectrum Between 1675 and 1710 MHz for Reallocation From Federal Use to Non-Federal Use Pursuant to Section 6401(a) of the Middle Class Tax Relief and Job Creation Act of 2012*, Report to the President (February 2013) ("February 2013 NTIA Report").

FCC Authority for Action. Not only is the Commission's authority to initiate a rulemaking on the 15 megahertz allocation clear, but it is also mandated by law. More than one year ago, Congress enacted the Middle Class Tax Relief and Job Creation Act of 2012, legislation that focused on addressing the "spectrum crunch" currently faced by the wireless industry. The Commission is currently working to implement several of the Spectrum Act's mandates, having recently initiated proceedings on auctioning the AWS H Block[35] and establishing rules for a broadcast incentive auction.[36] The Spectrum Act also stipulated that by February 22, 2015, the Commission must allocate and auction several other spectrum bands, including "[f]ifteen megahertz of contiguous spectrum to be identified by the Commission."[37]

Additionally, the Spectrum Act required that the Secretary of Commerce submit to the President a report identifying 15 megahertz of spectrum between 1675 and 1710 MHz for reallocation from Federal to non-Federal use. NTIA has since issued a Report to the President recommending that the 1695-1710 MHz band be the targeted band.[38] NTIA has asked Working Group 1 of the Commerce Spectrum Management Advisory Committee ("CSMAC") to evaluate improved modeling of commercial wireless networks and the possible reduction of exclusion zones in this band.[39] Within this working group, suggestions have been made to investigate alternative sharing approaches such as coordination zones, temporal sharing, and the feasibility of relocating satellite earth stations.[40] CSMAC has now recommended a regulatory framework for sharing in the 1695-1710 MHz band that will allow flexibility for and coordination of actual commercial system implementation within protection zones around federal meteorological-satellite receive sites.[41] NTIA has also been working with the National Oceanic and Atmospheric Administration ("NOAA") – the major Federal user of this band – to plan for the band's transition to commercial wireless use.[42] CTIA strongly believes that this spectrum should be paired with the 15 megahertz identified by the Commission in this proceeding, as described herein.

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35 *Service Rules for the Advanced Wireless Services H Block—Implementing Section 6401 of the Middle Class Tax Relief and Job Creation Act of 2012 Related to the 1915-1920 MHz and 1995-2000 MHz Bands*, Notice of Proposed Rulemaking, FCC 12-152 (2012).

36 *See TV Incentive Auctions NPRM*.

37 Spectrum Act § 6401(b)(2)(E).

38 *See* February 2013 NTIA Report.

39 NTIA, "Third Interim Progress Report on the Ten-Year Plan and Timetable at 7 (Nov. 2012), *available at* http://www.ntia.doc.gov/files/ntia/publications/third_interim_progress_report_final.pdf

40 *Id*. at 7-8.

41 See Commerce Spectrum Management Advisory Committee, Final Report, Working Group 1 – 1695-1710 MHz Meteorological-Satellite, *available at*: http://www.ntia.doc.gov/files/ntia/publications/wg_1_report.pdf. *See also* February 2013 NTIA Report at 2.

42 NTIA, "Third Interim Progress Report on the Ten-Year Plan and Timetable at 7 (Nov. 2012), *available at* http://www.ntia.doc.gov/files/ntia/publications/third_interim_progress_report_final.pdf

Timing For Reallocation. Given the Spectrum Act's mandate regarding identification of this spectrum, the Commission's authority to initiate this rulemaking is clear. Indeed, if the Commission is to meet its statutory deadline of February 22, 2015, it must act quickly to begin the hard work of repurposing new spectrum for mobile broadband use. Further, the Commission must set an accelerated timeframe if it is to comply with its own goal of bringing 300 megahertz of spectrum to market by 2015. Commencing efforts to identify this 15 megahertz of spectrum is a critical step that should be accomplished as quickly as possible.

Shortly after Congress passed the Spectrum Act, CTIA filed a letter with the Commission and with NTIA that laid out a timeline for the identification and auction of the spectrum identified in the Spectrum Act.[43] CTIA prepared this timeline based on the typical timetable employed by the Commission to commence a rulemaking, seek comment on service rules, seek comment on auction procedures, conduct an auction, and issue licenses. CTIA concluded that if the Commission adopted a Notice of Proposed Rulemaking in May 2012, it would be able to conduct an auction in August 2014 and grant licenses by February 22, 2015.[44] Given the passage of time, the overall schedule for meeting the statutory deadline of February 22, 2015 is even tighter than originally estimated by CTIA. It is therefore critical that the Commission immediately begin the process to identify and allocate the spectrum mandated by Congress if it is to comply with this rapidly approaching deadline.

Mobile Broadband Spectrum Characteristics. As the Commission considers spectrum bands that could yield the 15 megahertz specified in the Spectrum Act, it should be mindful of the characteristics that ideal mobile broadband spectrum would possess. In particular, and to the extent possible, the Commission should focus on spectrum bands below 3 GHz, spectrum that enables large, contiguous blocks, spectrum that is internationally harmonized, spectrum that is adjacent to current allocations, and spectrum that can be paired.

1. ***Spectrum Bands Below 3 GHz.*** It is well-established that spectrum bands below 3 GHz are the most desirable for mobile broadband because of their propagation characteristics. As NTIA has documented, frequencies below 3 GHz can be effectively transmitted and received by small, compact, relatively lightweight user terminals due to the propagation characteristics of this spectrum.[45] Indeed, NTIA found that "[a]ny 3G service that is targeted to

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[43] Letter from Steve Largent, President and CEO, CTIA – The Wireless Association® to FCC Chairman Julius Genachowski et al. (March 22, 2012), *available at* http://files.ctia.org/pdf/CTIA_Letter_to_FCC_Regarding_Implementation_of_Spectrum_Legislation_FINAL_signature.pdf.

[44] *Id.*

[45] *Federal Operations in the 1755-1850 MHz Band: The Potential for Accommodating Third Generation Mobile Systems*, Interim Report, U.S. Department of Commerce at 7 (rel. Nov. 15, 2000)

mobile users is most effectively provided by taking advantage of the properties of radio waves operating below 3 GHz.[46] In the Commission's National Broadband Plan proceedings, the wireless industry urged the Commission to examine lower frequency bands for this reason.[47]

2. ***Large, Contiguous Blocks.*** As carriers increasingly deploy advanced mobile broadband technologies such as LTE, the need for large, contiguous blocks of spectrum will become even greater than it is now. These technologies "benefit from deployment across wide radio channels delivering higher peak-data rates and more efficient use of the spectrum."[48] LTE operates in channels of up to 20 MHz, while LTE-Advanced will operate in up to 40 MHz channels.[49] By developing a band plan that enables large, contiguous blocks of spectrum, the Commission will "make radio implementations tractable and ensure that a majority of customers can be covered with practical deployments."[50] Further, in this instance, Congress has mandated explicitly that the 15 megahertz to be identified for reallocation be contiguous.[51]

3. ***Adjacency to Current Allocations.*** Identifying and allocating additional spectrum that is adjacent to that used for like services will promote efficiency in broadband deployment. As T-Mobile observed in an earlier proceeding, "the creation of an additional AWS allocation immediately adjacent to the current AWS-1 allocation will allow for more immediate equipment development and deployment."[52] This time advantage would speed the

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("NTIA Interim Report"), *available at* http://www.ntia.doc.gov/osmhome/reports/imt2000/imt2000.pdf (explaining that the physical processes governing the propagation of radio waves in the frequency range below 3 GHz let them be efficiently transmitted and received by small user devices and give them the ability to support high data rates, making them ideal for mobile telecommunications uses).

46 *Id.* at 7-8.

47 *See, e.g.*, Comments – NBP Public Notice # 6 of T-Mobile USA Inc., GN Docket No. 09-51, at 16 (Oct. 23, 2009) ("T-Mobile NBP PN #6 Comments") ("The identified spectrum also should reside below 3.7 GHz to ensure that it can be used economically to deliver mobile broadband services."); Comments of Motorola, Inc., GN Docket No. 09-51, at 10 (Oct. 23, 2009) ("Motorola NBP PN #6 Comments") (stating that "Motorola believes that mobile operations are best suited in bands below 4 GHz").

48 Rysavy Research, *Mobile Broadband Spectrum Demand* at 20 (Dec. 2008), available at http://www.rysavy.com/Articles/2008_12_Rysavy_Spectrum_Demand_.pdf.

49 *Id.*

50 Comments of Ericsson, ET Docket No. 10-142, at 3 (July 8, 2011).

51 Spectrum Act § 6401(b)(2)(E) ("[f]ifteen megahertz of contiguous spectrum to be identified by the Commission.").

52 Comments of T-Mobile USA, Inc., ET Docket No. 10-142, at 7-8 (July 8, 2011) ("T-Mobile Comments")"Current technology can more easily be extended to adjacent bands than to bands with different uplink/downlink separations."); *See also* Comments of AT&T Inc., ET Docket No. 10-142, at 4 (July 8, 2011) ("AT&T Comments")("placing new mobile broadband services in spectrum bands directly adjacent to existing mobile services can create efficiencies in developing infrastructure equipment and

deployment of and adoption of new services, and could prove crucial to the continued high performance of America's mobile broadband networks. Moreover, ensuring that paired spectrum is adjacent to existing current allocations will help to maintain a consistent frequency gap ("duplex gap") between base and mobile transmissions. A constant duplex gap, as has been argued forcefully in the TV Incentive Auctions proceeding,[53] will mitigate interference between commercial mobile broadband licensees while enabling a rapid and efficient deployment of new base station and mobile equipment.

4. Paired Spectrum. There are significant benefits, especially in this case, that should compel the Commission to consider making the 15 megahertz available so that it is readily able to be paired. First, the Department of Commerce is under a statutory mandate to identify and license 15 megahertz of spectrum, as discussed above. Given that the Commission must also identify the same amount of spectrum, it would be apparent that Congress intended for these two 15 megahertz spectrum bands to complement one another through ready pairing for base and mobile station communications. If both of these allocation and licensing decisions were made without consideration of effective pairing, resulting in two orphaned 15 megahertz spectrum blocks, the Commission would neither best benefit the public nor fulfill Congress' clear intent to generate significant revenues to help fund the Public Safety Trust Fund and help reduce the federal deficit. CTIA submits that valuation studies in the context of other spectrum bands have shown that paired spectrum is more valuable than unpaired spectrum, making pairing of these spectrum bands critical to meeting revenue goals established by Congress and to maximizing the efficiency of their use. [54]

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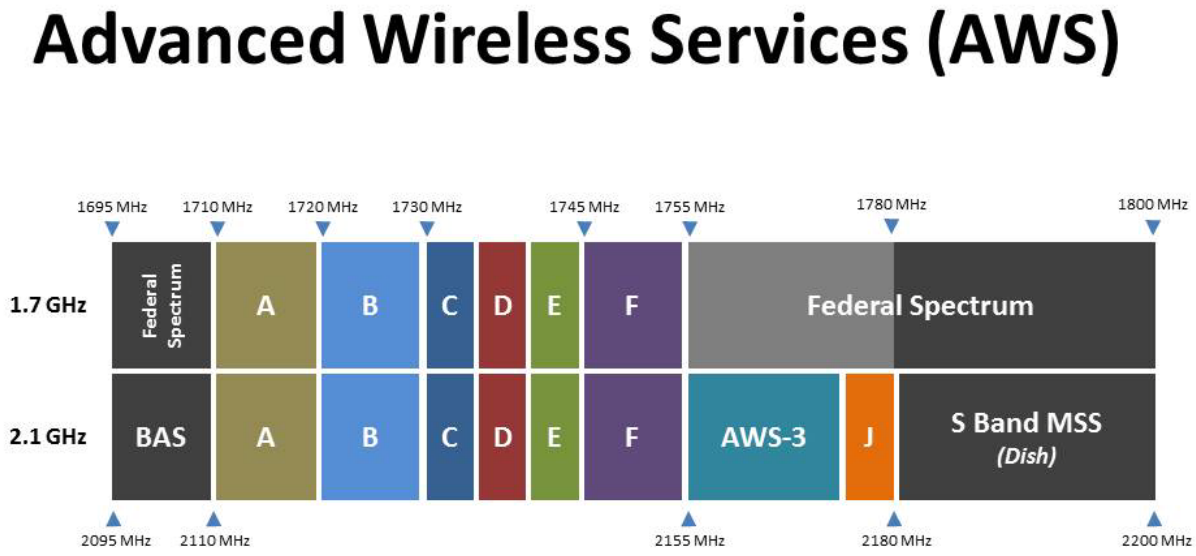
consumer devices that will speed deployment and adoption of new services."") Comments of Sprint Nextel Corporation, ET Docket No. 10-142, at 3 (July 8, 2011) ("Sprint Nextel Comments") (noting that the proximity of 2 GHz spectrum to AWS and PCS spectrum means that "compatible handsets likely could be produced relatively quickly to support innovative wireless services").

[53] *See, e.g.*, Comments of Motorola Mobility LLC, GN Docket No. 12-268, at 11 (Jan. 25, 2013) ("It is important, however, that the Commission establish a fixed-sized duplex gap and avoid crafting the forward auction in a manner that would enable variably sized duplex gaps in different regions of the country. This would create significant challenges for equipment and chip-set design and negatively affect nationwide interoperability in the band."); Comments of Verizon and Verizon Wireless, GN Docket No. 12-268, at 10 (Jan. 25, 2013) ("In markets with less than 84 MHz clearing, it is important to align the duplex gaps with the base plan's duplex gap to facilitate the development of a single device that can be used for nationwide deployment.").

[54] In the 2 GHz spectrum context, the Brattle Group found that if AWS-3 spectrum was paired with 20 MHz of spectrum in the 2155-2180 MHz band, there would result considerable efficiencies and a valuation of $12 billion for the combined 40 MHz of spectrum. If the AWS-3 spectrum was auctioned unpaired, the Brattle Group predicted that the spectrum would be valued at just $3.6 billion. The Brattle Group, "The Economic Basis of Spectrum Value: Pairing AWS-3 with the 1755 MHz Band is More Valuable than Pairing it with Frequencies from the 1690 MHz Band" at 12 (Apr. 11, 2011), attached to Letter from Coleman Bazelon, The Brattle Group to Marlene H. Dortch, FCC, ET Docket No. 10-123 (Apr. 11, 2011).

CTIA urges the Commission to keep these characteristics in mind as it evaluates candidate bands to satisfy its 15 megahertz obligation. By following these guiding principles, the Commission will help promote an environment for new mobile broadband services that fosters innovation and efficient deployment.

BAS Spectrum Best Suited For Reallocation and Pairing. The Commission should closely evaluate the 2095-2110 MHz band in its rulemaking to identify 15 megahertz of new mobile broadband spectrum. The 2095-2110 MHz band is ideally suited for mobile broadband, given its characteristics and the promise of pairing this band with the 1695-1710 MHz band. Given that the Department of Commerce has identified the 1695-1710 MHz band for its 15 megahertz of reallocated spectrum, CTIA believes the spectrum band most consistent with the principles discussed above for reallocation is the 2095-2110 MHz band. The 1695-1710 MHz spectrum has been studied by the CSMAC WG-1 process as a mobile uplink band (mobile devices would transmit at these frequencies) with no consideration of using this spectrum for base downlink (in which base stations would transmit). This use of the 1695-1710 band would also be consistent with the use of the adjacent AWS-1 spectrum (1710-1755 MHz) which is also a mobile uplink band, as can be seen in the figure below. To put the 1695-1710 MHz band to its best use, it most logically would be added to the existing 1710-1755 MHz band to provide a 60 megahertz mobile uplink band for AWS from 1695-1755 MHz. Additionally, spectrum would logically be needed for base downlink, to extend the 2110-2155 MHz downlink band to a symmetrical 60 MHz.



As such, the 2095-2110 MHz band is the clear choice for the Commission to identify and reallocate. This spectrum band is below 3 GHz, is contiguous and adjacent to current allocations and would allow pairing in a readily achievable fashion. CTIA is not aware of any other spectrum bands as well-positioned as this band to meet all the key principles for mobile broadband spectrum that could be put to timely use and generate significant revenues through a competitive bidding process.

Indeed this pairing has already been proposed by Ericsson in the Commission's 2011 proceedings on NTIA spectrum bands[55] and 2 GHz[56] spectrum. While Ericsson focused on pairing the 1675-1710 MHz and 2075-2110 MHz bands, a 15 x 15 MHz pairing of the upper BAS band with the 1695-1710 MHz band would have many of the same benefits. This location "creates some synergies that would make it suitable for mobile broadband services" and "reduces the risk of harmful interference between licensees."[57] Ericsson further noted that this pairing "maintains the same duplex distance between uplink and downlink as is used in AWS-1 and therefore allows the use of existing, proven technology."[58]

However, as can be seen from the above figure, there are existing incumbents in the 2095-2110 MHz band. The Broadcast Auxiliary Service ("BAS") currently uses the 2095-2110 MHz band to relay aural and television signals. BAS stations can be used to relay signals from the studio to the transmitter, or between two points. BAS also includes mobile TV pickups and remote pickup stations which relay signals from a remote location back to the studio. The BAS band is divided into seven channels, each of which is 12 MHz wide.

In addition to hosting BAS, the 2025-2110 MHz band is also home to the Federal space operation service, earth exploration-satellite service, and space research service.[59] There are currently 11 locations in the United States where Federal satellite earth stations are permitted to operate on a co-primary basis with non-Federal operations.[60] The Commission has required coordination between Federal and non-Federal users of this band, and that terrestrial transmitters used for BAS not be high-density systems.[61] CTIA suggests that the Commission will need to work with NTIA and Federal users to understand the need for the Federal government to have access to the entire 2025-2110 MHz band. Moreover, if full and complete clearing is not possible (and CTIA believes that should be the goal), the Commission and NTIA should determine whether sharing between mobile broadband base stations and Federal incumbents is possible in the 2095-2110 MHz portion of the band.

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55 Comments of Ericsson, ET Docket No. 10-123, at 18 (April 22, 2011) ("Ericsson NTIA Bands Comments").

56 Comments of Ericsson, ET Docket No. 10-142, WT Docket Nos. 04-356 and 07-195, at 4-5 (July 8, 2011) ("Ericsson 2 GHz Comments").

57 Ericsson NTIA Bands Comments at 17.

58 Ericsson 2 GHz Comments at 5.

59 47 C.F.R. 2.106, n. US346.

60 *Id.*

61 *Id.*

In 2000, the Commission elevated the above-referenced Federal systems to primary status in the BAS band.[62] To minimize the likelihood of interference to Government satellite communications from non-Federal terrestrial operations, the Commission adopted domestically International Footnote S5.391, which states that high-density mobile systems shall not be introduced in the band.[63] This footnote came about as the result of ITU Recommendation ITU-R SA.1154, adopted at the World Radiocommunication Conference in 1995.[64]

CTIA submits that Footnote S5.391 (and its domestic counterpart, US346) should not serve as a barrier to Commission exploration of the 2095-2110 MHz band as a potential home for mobile broadband services. As an initial matter, the ITU developed its recommendation nearly 20 years ago and countless changes in technology have taken place since that time. Further, the ITU was focused on precluding the use of mobile devices in this band and, as discussed above, CTIA believes this spectrum would best be used for base station operations, not mobile transmission.[65] While the ITU also conducted a study focused on fixed microwave systems,[66] these are technologically different than base stations used for mobile broadband services. At a minimum, the Commission should investigate whether the original concerns regarding interference in this band continue to have merit given the deployment of new technology and the desire to limit operations in this band to fixed base stations rather than mobile devices.

Further, as Footnote S5.391 was added by the Commission, the Commission has the right to modify, clarify, or delete the footnote as it sees fit. In light of the considerable changes in technology that have occurred since 1995, the scarcity of suitable mobile broadband spectrum, and the Commission's statutory duty to produce an additional 15 megahertz in the next two years, the Commission should launch an investigation into this upper portion of the BAS band to determine whether it can be used to help alleviate the spectrum crunch.

In accordance with the above, CTIA respectfully requests that the Commission promptly initiate efforts to identify and allocate 15 megahertz of spectrum for mobile broadband services, in accordance with the National Broadband Plan and the Spectrum Act.

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62 *Mobile-Satellite Service*, Second Report and Order and Second Memorandum Opinion and Order, 15 FCC Rcd 12315, ¶ 16 (2000).

63 *Id.*

64 *Id.* at ¶¶ 14-16. *See also* Rec. ITU-R SA.1154.

65 Rec. ITU-R SA.1154.

66 Rec. ITU-R F.1247.